

CLAIMS

What is claimed is:

1. An imaging system comprising an image sensor, a memory, and a processor, wherein:
2 the image sensor is configured to generate image signals corresponding to an image of a scene;
3 the memory is configured to store image data corresponding to the image signals; and
4 the processor is configured to control operations of the imaging system in a diagnostic mode and in a
5 normal operating mode, wherein, during the diagnostic mode, the processor analyzes the image data to
6 determine if the image sensor is defective.

1 2. The invention of claim 1, wherein:

2 the image sensor, the memory, and the processor are implemented as a system-on-a-chip (SOC) in a
3 single integrated circuit; and
4 the image sensor is a digital pixel sensor that generates digital image signals for storage in the memory.

1 3. The invention of claim 1, wherein the diagnostic mode enables the imaging system to be tested using
2 a testing system, wherein:

3 the processor generates instructions for controlling test operations of the testing system;
4 the testing system provides a set of light stimuli for the image sensor in response to the instructions; and
5 the processor generates test results based on the image data indicating whether the image sensor is
6 defective.

1 4. The invention of claim 3, wherein the test results are stored in the imaging system for access by the
2 processor during the normal operating mode.

1 5. The invention of claim 3, wherein the test results identify a set of one or more defective pixels in the
2 image sensor.

1 6. The invention of claim 3, wherein the imaging system is configured to use the test results during the
2 normal operating mode to compensate for one or more defective pixels identified during the diagnostic mode.

1 7. The invention of claim 3, wherein the testing system is configured to test a packaged image sensor.

1 8. A method for fabricating an imaging system comprising the steps of:

2 (a) forming an image sensor configured to generate image signals corresponding to an image of a scene;
3 (b) forming a memory configured to store image data corresponding to the image signals; and

- (g) forming a processor configured to control operations of the imaging system in a diagnostic mode and in a normal operating mode, wherein, during the diagnostic mode, the processor analyzes the image data to determine if the image sensor is defective.

1 9. The invention of claim 8, wherein:

the image sensor, the memory, and the processor are implemented as a system-on-a-chip (SOC) in a single integrated circuit; and

the image sensor is a digital pixel sensor that generates digital image signals for storage in the memory.

1 10. The invention of claim 8, wherein the diagnostic mode enables the imaging system to be tested using
2 a testing system, wherein:

3 the processor generates instructions for controlling test operations of the testing system;
4 the testing system provides a set of light stimuli for the image sensor in response to the instructions; and
5 the processor generates test results based on the image data indicating whether the image sensor is
6 defective.

1 11. The invention of claim 10, wherein the test results are stored in the imaging system for access by the
2 processor during the normal operating mode.

1 12. The invention of claim 10, wherein the test results identify a set of one or more defective pixels in the
2 image sensor.

1 13. The invention of claim 10, wherein the imaging system is configured to use the test results during the
2 normal operating mode to compensate for one or more defective pixels identified during the diagnostic mode.

14. The invention of claim 10, wherein the testing system is configured to test a packaged image sensor.

1 15. An imaging system comprising an image sensor, a memory, and a processor, wherein:

the image sensor is configured to generate image signals corresponding to an image of a scene;

the memory is configured to store image data corresponding the image signals; and

the processor is configured to control operations of the imaging system in a normal operating mode,

5 wherein, during the normal operating mode, the processor processes the image data to compensate for one or
6 more defective pixels in the image sensor.

16. The invention of claim 15, wherein:

the image sensor, the memory, and the processor are implemented as a system-on-a-chip (SOC) in a single integrated circuit; and

3 the image sensor is a digital pixel sensor that generates digital image signals for storage in the memory.

1 17. The invention of claim 15, wherein the processor is further configured to control operations of the
2 imaging system in a diagnostic mode, wherein, during the diagnostic mode, the processor analyzes the image
3 data to identify the one or more defective pixels in the image sensor.

1 18. The invention of claim 17, wherein the diagnostic mode enables the imaging system to be tested
2 using a testing system, wherein:

3 the processor generates instructions for controlling test operations of the testing system;
4 the testing system provides a set of light stimuli for the image sensor in response to the instructions; and
5 the processor generates test results based on the image data indicating whether the image sensor is
6 defective.

1 19. The invention of claim 18, wherein the test results are stored in the imaging system for access by the
2 processor during the normal operating mode.

1 20. The invention of claim 18, wherein the testing system is configured to test a packaged image sensor.